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 **ASTRAL  
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**INFRA  
DIVISION**

**ENHANCED CORRUGATED  
HDPE / PP DUCTS  
FOR POST TENSIONING**



**Plus+StiRex<sup>®</sup>**



# Plus+StiRex<sup>®</sup>

## POST TENSIONING DUCTS

## INTRODUCTION

The Plus+StiRex ducts are manufactured using modern state-of-the-art machinery. The process used is basically plastic extrusion process. Use of plastics as a duct material is relatively recent with obvious and evident greater advantages over the previous metal ducts as well as plain plastic pipes which exhibit a greater wobble. Our previous version Pre-StiRex is a renowned brand in the field of PT Ducts with an experience of supplying more than 20,000 Kms. to various infra structural projects. This experience

and expertise, allows us to respond quickly to the market requirements and provide better Solutions continually. This has resulted in the development and design of a new product, marketed under the brand name Plus+StiRex, having obvious advantages over the former. The new product development has helped the Post tensioning sector enormously owing to its structure and profile. The ducts conform to the International Standard FIB Bulletin - 7 and various Indian Standards.

## TECHNICAL DATA

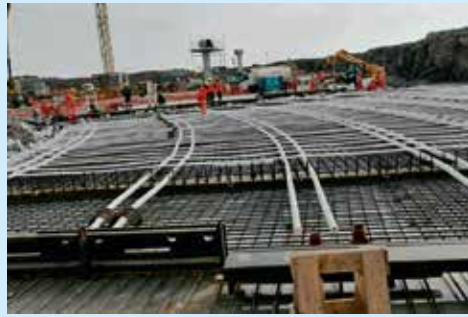
Normal Sizes	*S4 = 2.5 mm & I.D. / O.D. Type II	*S4 = 3 mm & I.D. / O.D. Type III	*S4 = 3.5 mm & I.D. / O.D. Type III
59/74	59/74	--	--
69/84	69/84	--	--
76/91	76/91	--	--
86/101	86/101	--	--
100/116	--	100/116	99/116
107/123	--	106/123	105/123
115/131	--	115/131	114/131
130/146	--	103/146	129/146
140/157	--	--	140/157
Flat Duct 90/22	--	--	--
Flat Duct 72/22	--	--	--
Flat Duct 60/22	--	--	--

**Tolerance:** +/- 1mm

**Standard Packing:** In 5.8 Mtr. and 11.8 Mtr. Straight bars for export. In 6 Mtr. Straight bars for domestic sale.

**Standard Colour:** Black. Also available in various colors on request.





## UNIQUE DESIGN

The ducts are designed to meet the specific site requirements. The design will reduce the friction losses prevalent during tendon stressing. The unique design allows for an efficient transfer of forces from the tendon to the surrounding concrete structure which seldom is the case with the steel ducts owing to its rigidity and inflexibility. These ducts are designed to sustain the crushing loads at tendon supports. The flexibility is sufficiently maintained to minimize the wobble coefficient. The design helps to achieve a good lateral strength. These ducts are provided with special ribs which act as interlocking seams. The ribs help to provide an excellent bond with the surrounding concrete. The design allows for a better strength. The design allows for low weight with optimum strength which enables easy handling and installation of the Plus+StiRex duct system.

## ADVANTAGES

- Corrosion Protection.
- Joining is very easy.
- Chemically Inert.
- Helps electrical monitoring of tendons.
- Good weathering resistance.
- Environment friendly.
- Good impact and compression strength.
- High stiffness and flexibility.
- Enhances fatigue life of tendons.
- Low friction co-efficient.
- Due to more thickness Plus+StiRex ducts can withstand PT steel forces during stressing.
- The intermittent and distant corrugations in Plus+StiRex reduce wobbling effect of the duct

## APPLICATIONS

The ducts are being used abundantly in the construction sector for applications like mono-strands, multi-strands, ground anchors, stay cables, etc. in post tensioning of bridges, flyovers, etc. The ducts are used in the nuclear power sector for post tensioning of nuclear containment domes. It would also withstand the effects of atomic hydrogen embrittlement.

- Flyovers
- Bridges
- Viaducts
- Underpasses
- Tunnels
- Pipelines
- PT Slabs
- Elevated Structure
- Nuclear Containments
- Offshore Platforms





## MATERIALS

A wide variety of materials can be used for manufacturing these ducts. The materials used are polyolefins which make the ducts extremely corrosion resistant. Use of polyolefins renders them extremely resistant to alkalis as well as solvents, they are also resistant to acids. Various grades ranging from polyethylene to polypropylene can be used. These materials can be compounded to provide for various colors like Black, White, Orange, Red, Green and Blue. The materials can be compounded to provide for a good UV resistance. Various specifications and codes lead to the use of only specific raw materials.

## TESTING

Tests are carried out at the factory site wherein a state-of-the-art laboratory is provided for testing the products and the raw materials. The testing includes testing as per FIB Bulletin 7, IRC 18:2000, Railway Bridge IRS CBC code on ducts as well as raw materials. A typical ITP (Internal Test Plan) is provided to the customer according to which testing is executed at the laboratory. Vital Testing Parameters -

- Raw Material Tests
- Longitudinal Load Resistance
- Flexibility
- Friction Parameters
- Flexural Behaviour
- Leak Tightness
- Wear Resistance
- Electrical isolation
- Lateral Load Resistance
- Corrosion Protection
- Bond Behaviour

## JOINTING METHODS & ACCESSORIES

The ducts are jointed using state-of-the-art heat shrink couplers made from cross linked polyethylene (XLPE) with an adhesive lining which are very easy to install. The couplers are first placed on to the duct jointing area. Using either hot air or a gas burner, the ducts can be jointed effectively. This gives a clean, easy, secure and a leak tight joint. The ducts can also be jointed with the alternate press fit couplers made of copolymers of polypropylene or alternatively, high density polyethylene with elastomeric sealing rings. The ducts are provided with grout ports, grout tubes and grout valves for grout flow control.

- Press Fit Coupler
- Grout Port
- Press Fit Coupler with Sealing Rings
- Grout Valve
- Heat Shrink Coupler
- Grout Vent Tube



Heat Shrink Coupler



Press Fit Couplers & Sealing Rings



Grout Port & Grout Valve



## FLAT DUCTS

The unique shape has made it an instant success. It has catered to applications where space is a constraint. Generally speaking, it won't be possible to use the round section ducts in post tensioned slabs due to the slab thickness constraint. Flat ducts have proven to be a boon in this sector.

The design is quite unique and optimized, which has an edge over the conventional metal ducts.

0.08" (2mm)  
minimum wall thickness



Ribs

Size:  
(90 mm X 22 mm) ID  
(72 mm X 22 mm) ID  
(60 mm X 22 mm) ID

## COMPARISON

Properties	Intermittent Corrugation Plus+StiRex PP	Intermittent Corrugation Plus+StiRex PE
Wear resistance during stressing	Very good	Excellent
Flexural behaviour	Excellent	Excellent
Lateral load resistance	Good	Very Good
Mechanical stability during installation and grouting	Very Good	Very Good
Leak tightness	Excellent	Excellent
Longitudinal load resistance	Very good	Very good
Flexibility	Good	Good
Friction Coefficient	Excellent	Excellent
Risk of fretting fatigue	Good	Good
Mechanical bond	Very good	Very good
Electrical isolation (optional)	Excellent	Excellent
Resistance to oxidation	Excellent	Excellent
Transfer of forces	Very good	Very good
UV stability	Very good	Very good
High temperature stability	Poor	Excellent
Low temperature stability	Excellent	Poor
ESCR	Excellent	Excellent
Corrosion of duct installation	Excellent	Excellent
Corrosion protection to tendons	Excellent	Excellent



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TRA's Brand Trust  
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